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EXAMINER

WOZNIAK, JAMES S

ART UNIT

PAPER NUMBER

2655

DATE MAILED: 07/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/688,010

Applicant(s)

BELLEGARDA, JEROME R.

Examiner

James S. Wozniak

Art Unit

2655

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 6/1/2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 October 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

Detailed Action

1. In response to the office action from 2/26/2004, the applicant has submitted an amendment, filed 6/1/2004, amending claims 1, 4, 8, 13, 14, 15, 20, 27, 31, 34, and 35, while arguing to traverse the art rejection based on the limitation regarding the classification of a speech command by utilizing a vector representations of words in a semantic space (*Amendment, Page 9*). Applicant's arguments have been fully considered, however are moot in view of the new grounds of rejection necessitated by the amended claims.

2. Based on the amendments to the claims, the examiner has withdrawn the previous objections directed towards minor informalities.

Response to Arguments

3. With respect to **Claims 7-10, 13-19, 25-28, 33, 34, 37, and 38**, the applicant requests references in support of Official Notice (*Amendment, Page 9*). The following references address the aforementioned claims:

- With respect to **Claims 7 and 25**, Karaorman et al (*U.S. Patent: 6,631,346*) teaches assigning a classifying tag indicative of speech input content that utilizes context information (*Col. 6, Lines 19-65*), which is a functional equivalent of a semantic anchor.

- With respect to **Claims 8 and 26**, Bangalore et al (*U.S. Patent: 6,317,707*) teaches the use of a distance measure between an input speech vector and a context word vector, which is a functional equivalent of a semantic anchor vector, in order to cluster words or phrases based upon lexical significance (*Col. 1, Line 59- Col. 2, Line 15*). Also, as is noted in the previous office action, **Claims 13, 33, and 37** contain subject matter similar to Claim 8, and thus, are rejected for the same reasons.
- With respect to **Claims 9 and 27**, Bangalore teaches the use of a distance measure as a means of determining similarity in word and phrase clustering, as applied to Claims 8 and 25. Bangalore also suggests that this distance calculation is related to a shortest distance selection (*Col. 3, Line 65- Col. 4, Line 3*). Furthermore, as noted in the previous office action, **Claims 14, 34, and 38** contain subject matter similar to Claim 9, and thus, are rejected for the same reasons.
- With respect to **Claim 15**, Hoshimi et al (*U.S. Patent: 5,345,536*) teaches the use of a correlation cosine distance measure in determining the similarity between feature vectors (*Col. 7, Line 30- Col. 8, Line 34*). Moreover, Prager (*U.S. Patent: 5,943,670*) recites that a largest cosine distance indicates the maximum similarity between vectors in a data clustering application (*Col. 7, Lines 45- 56*).
- The rejections of **Claims 10, 16-18, and 28** do not rely on Official Notice, and thus, are maintained.
- With respect to **Claim 19**, Bangalore teaches the speech clustering method as applied to Claim 8, in which the grammatical content of a word or phrase is

analyzed (*Col. 1, Line 59- Col. 2, Line 15*). Therefore word order would not be important since only the grammatical content of a phrase would be analyzed for clustering.

Election/Restrictions

4. **Claims 39-45** have been cancelled.

Double Patenting

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. **Claims 1-38** are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over **Claims 1-24** of U.S. Patent No. 6,208,971 in view of Gorin et al (*U.S. Patent: 5,860,063*). The addition of a word agglomeration unit to U.S. Patent No. 6,208,971, would have been obvious to one of ordinary skill in the art at the time of invention since the well-known clustering technique of word agglomeration (*clustering meaningful phrases using an agglomerative clustering procedure, Col. 7, Lines 38-39*) is a more specific embodiment of the well-known clustering method referred to in Bellegarda et al (*word sequence classification implemented using clustering algorithms well known to those skilled in the art, Col. 6, Lines 11-17*). Also, the additional limitations pertaining to semantic anchors from training data, calculation of a distance to determine correlation, and word sequence order would all have been obvious to one of ordinary skill in the art, at the time of invention since, respectively, training allows for the well-known technique of detecting speech from a specific speaker, distance calculation is a well-known means of correlation determination in clustering (*Col. 7, Lines 38-39*), and semantic relations would be dependent upon word order, since semantics regards meaning within language, and words must be properly arranged in order to convey meaning in the form of a complete thought or command.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 1-6, 12-14, 16-24, and 31-38** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gorin et al (*U.S. Patent: 5,860,063*) in view of Bangalore et al (*U.S. Patent: 6,317,707*).

With respect to **Claims 1, 20, 31, and 35**, Gorin discloses:

A method and machine readable medium containing instructions for recognizing speech (*Col. 2, Lines 54-66*), the method comprising:

Recognizing a sequence of words received as a voice command (*meaningful phrase processed by speech recognizer to perform a related task, Col. 2, Lines 25-29*).

Processing the sequence of words using word agglomeration (*clustering meaningful phrases using an agglomerative clustering procedure, Col. 7, Lines 38-39*).

Classifying the processed sequence of words as a predetermined command (*classifying clustered phrases related to a command, Col. 7, Line 66- Col. 8, Line 4 and word sequence vectors, Figs. 6 and 7*).

Gorin does not teach that the classification of a word sequence is based upon a vector representation of the processed sequence of words in a semantic space, however, Bangalore recites:

Classification of a word sequence is based upon a vector representation of the processed sequence of words in a semantic space (*vector representation of a word or phrase used for clustering based upon lexical significance that is determined by a distance measure, Col. 1, Line 59- Col. 2, Line 15*).

Gorin and Bangalore are analogous art because they are from a similar field of endeavor in word clustering in speech processing. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to combine the means of clustering a word sequence according to a vector representation and based on lexical significance as taught by Bangalore with the command clustering means through an agglomerative method as taught by Gorin to provide a well known means of representing speech features for similarity distance calculations in command clustering. Therefore, it would have been obvious to combine Bangalore with Gorin for the benefit of obtaining a well known speech feature representation in vector form in order to group speech commands based upon grammatical similarity.

With respect to **Claims 2 and 21**, Gorin further recites:

Performing an action corresponding to the predetermined command (*speech input command related to a number of executable actions, Col. 4, Lines 21-45*).

With respect to **Claims 3 and 22**, Gorin further discloses:

Processing comprising: replacing the sequence of words with an associated word n-tuple sequence (clustering process grouping similar phrases all associated with a single voice command, *Col. 7, Line 38- Col. 8, Line 4*).

With respect to **Claims 4 and 23**, Gorin recites:

The method of claim 1 (interpreted by the examiner as Claim 3) and computer readable medium of claim 22, wherein the associated word n-tuple sequence is a sequence of all strings of n consecutive words present in the sequence of words (*clustering process grouping similar phrases all associated with a single voice command, Col. 7, Line 38- Col. 8, Line 4 and Fig. 3*).

With respect to **Claims 5 and 24**, Gorin adds:

Classifying comprising: semantically inferring the predetermined command from the associated word n-tuple sequence (*clustering of phrases through semantic relations used in recognizing a voice command, Col. 8, Lines 58-64*).

With respect to **Claim 6**, Gorin further discloses:

Classifying comprises semantically inferring the predetermined command from the sequence of words (*clustering of phrases through semantic relations used in recognizing a voice command, Col. 8, Lines 58-64*).

With respect to **Claim 12**, Gorin suggests:

Semantically inferring the predetermined command depends on the order of the words in the processed sequence of words (*clustering of phrases through semantic relations used in recognizing a voice command, Col. 8, Lines 58-64*). One of ordinary skill in the art, at the time of invention, would have known that a semantic relation is dependent upon word order, since semantics regards meaning within a given language, and the words must be arranged in certain order to convey nuances of meaning.

Claims 13, 33, and 37 recite subject matter similar to Claim 8, and thus are rejected for similar reasons.

Claims 14, 34, and 38 recite subject matter similar to Claim 9, and thus are rejected for similar reasons.

With respect to **Claim 16**, Gorin further discloses:

The vector representation is an indication of how frequently each of a plurality of word n-tuples occurs within the processed sequence of words (*phrase vectors containing information relating to the phrase occurrence amount, Col. 7, Lines 10-15*).

With respect to **Claim 17**, Gorin recites:

The vector representation is an indication of how frequently each of a plurality of word n-tuples occurs with respect to the corresponding command (*phrase vectors containing information relating to the number of occurrences within various command classes, Col. 7, Lines 10-15*).

With respect to **Claim 18**, Gorin discloses:

Each of the plurality of semantic anchors represents a plurality of different ways of speaking the corresponding command (*Fig. 6, and Col. 7 Line 66-Col. 8, Line 4*).

With respect to **Claim 19**, Gorin in view of Bangalore recites the method of clustering similar commands spoken in different manners as applied to Claim 18. Also, it would have been obvious to one of ordinary skill in the art, at the time of invention, that similar phrase clustering as taught by Gorin would also include the clustering of similar commands with variations in word order since those alternate phrases would still be referring to the same command (*as evidenced by Bangalore- the speech clustering method as applied to Claim 8, in which the grammatical content of a word or phrase is analyzed Col. 1, Line 59- Col. 2, Line 15. Therefore word order would not be important since only the grammatical content of a phrase would be analyzed for clustering*).

With respect to **Claims 32 and 36**, Gorin in view of Bangalore discloses:

An action generator, coupled to the semantic classifier, to use the vector representation to determine an action to be performed (*classification processor, Fig. 4, Element 30, task objectives, Fig. 4, and speech vectors as taught by Bangalore and applied to Claim 1*).

9. **Claims 7-11 and 25-30** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gorin et al in view of Bangalore et al, and further in view of Karaorman et al (*U.S. Patent: 6,631,346*).

With respect to **Claims 7 and 25**, Gorin in view of Bangalore teaches the method of determining a command by phrase clustering through semantic relations as applied to Claim 6. Gorin in view of Bangalore does not specifically suggest the use of a semantic anchor as a means of identifying the semantic relations between a command phrase and a sequence of words. The examiner has interpreted “semantic anchor” to mean an accompanying word or phrase that helps identify the specific meaning of a word or phrase (in the present example, a command word or phrase). Thus, it would have been obvious to one of ordinary skill in the art, at the time of invention, from the definition of “semantic anchor” as interpreted by the examiner, that the phrase clustering utilizing semantic relations as taught by Gorin would include a semantic anchor as a means of identifying the semantic relations between a command phrase and a sequence of words to differentiate similar phrases as used in various contexts (*as evidenced by Karaorman-assigning a classifying tag indicative of speech input content that utilizes context information Col. 6, Lines 19-65, which is a functional equivalent of a semantic anchor*). Gorin, Bangalore, and Karaorman are analogous art because they are from a similar field of endeavor in word

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clustering and thus, obvious in combination as a means of identifying the semantic relations between a command phrase and a sequence of words to differentiate similar phrases as used in various contexts.

With respect to **Claims 8 and 26**, Bangalore additionally discloses:

The correlation is a distance between a vector corresponding to the processed sequence of words and a vector corresponding to the at least one semantic anchor (*distance measure between an input speech vector and a context word vector, which is a functional equivalent of a semantic anchor vector, in order to cluster words or phrases based upon lexical significance, Col. 1, Line 59- Col. 2, Line 15*).

With respect to **Claims 9 and 27**, Gorin in view of Bangalore teaches the method of determining a command by phrase clustering through a vector distance calculation as applied to Claim 7. Also, it would have been obvious to one of ordinary skill in the art, at the time of invention, to select a command having the shortest distance from a semantic anchor since a minimal distance would be directly related to a greater amount of correlation and thus, a higher likelihood that a particular voice command corresponds to a semantic anchor for successful command recognition (*as evidenced by Bangalore- distance calculation related to a shortest distance selection, Col. 3, Line 65- Col. 4, Line 3*).

With respect to **Claims 10 and 28**, Gorin further discloses:

The semantic anchor represents a one of a plurality of predetermined commands (*example of words relating to billing and credit card payment commands, providing semantic information to differentiate similar terms within different contexts, Col. 7, Lines 42-49*).

With respect to **Claims 11 and 29**, Gorin discloses:

The at least one semantic anchor is derived from a training data (*training of a phrase associated with a command, Col. 7, Lines 10-15, to be used in clustering through semantic relations as applied to Claim 6*).

With respect to **Claim 30**, Gorin suggests:

Semantically inferring the predetermined command depends on the order of the words in the processed sequence of words (*clustering of phrases through semantic relations used in recognizing a voice command, Col. 8, Lines 58-64*). One of ordinary skill in the art, at the time of invention, would have known that a semantic relation is dependent upon word order, since semantics regards meaning within a given language, and the words must be arranged in certain order to convey nuances of meaning.

10. **Claim 15** is rejected under 35 U.S.C. 103(a) as being unpatentable over Gorin et al in view of Bangalore et al, further in view of Hoshimi et al (*U.S. Patent: 5,345,536*), and further in view of Prager (*U.S. Patent: 5,943,670*).

With respect to **Claim 15**, Gorin in view of Bangalore teaches the method of comparing a command vector to a semantic anchor vector via a distance calculation as applied to Claim 9. Also, it would have been obvious, to one of ordinary skill in the art at the time of invention, to implement the method of dimensionality reduction by singular value decomposition as recited in Claim 15 as a correlation calculation portion of a distance between two vectors since it is well-known in the art, as in a matched filter application, to reduce the distance computation to a correlation coefficient (cosine of an angle between the vectors being compared) to decrease the distance calculation complexity (*as evidenced by Hoshimi- use of a correlation cosine distance*

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measure in determining the similarity between feature vectors, Col. 7, Line 30- Col. 8, Line 34.

Moreover, Prager recites that a largest cosine distance indicates the maximum similarity between vectors in a data clustering application, Col. 7, Lines 45- 56.). Gorin, Bangalore, Hoshimi, and Prager are analogous art because they are from a similar field of endeavor in cluster-related processing and thus, obvious in combination as a means of reducing distance calculation complexity.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

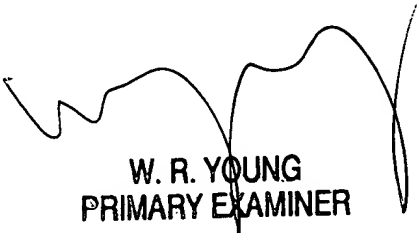
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12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Wozniak whose telephone number is (703) 305-8669 and email is James.Wozniak@uspto.gov. The examiner can normally be reached on Mondays-Fridays, 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Talivaldis Ivars Smits can be reached at (703) 306-3011. The fax/phone number for the Technology Center 2600 where this application is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the technology center receptionist whose telephone number is (703) 306-0377.

James S. Wozniak
7/7/2004



W. R. YOUNG
PRIMARY EXAMINER